Emerging Technology in German Port Security: Electronic Container Seals

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Introduction

In the aftermath of September 11, the Department of Homeland Security (DHS) introduced border protection initiatives in order to prevent future potential terrorist attacks against the nation, of which some were designed to protect the nation's seaports. The agencies under the supervision of the DHS such as the U.S. Customs and Border Control and the U.S. Coast Guard are responsible for controlling activities within and between U.S. and foreign ports. By taking a layered approach to security, the DHS has utilized the expertise of its bureaus (the U.S. Coast Guard and Customs and Border Protection), the private sector, and state as well as local authorities, to create a system entailing different security measures to ensure control at the highest level of protection before, during, and after a sea-based journey. In particular, maritime security efforts entail the following:

Overseas
- 24-hr Advance Manifest
- Container Security Initiative
- Customs-Trade Partnership Against Terrorism
- International Ship and Port Security Code
- International Port Security Program
- Operation Safe Commerce

In Transit
- Smart Box Initiative
- Ship Security Alert System
- Automated Targeting System
- 96-Hour Advance Notice of Arrival

On U.S. Shores
- National Targeting Center
- Security Boardings
- Automatic Identification System
- Security Committees Port Security Grants
- Radiation, Chemical, and Biological Screening
- Operation Drydock
- America's Waterway Watch
- Intelligence Fusion Centers
- Operation Port Shield
- Maritime Transportation Security Act
- Port Security Assessment Program
- Non-Intrusive Inspection Technology
- Maritime Safety and Security Teams
- Transportation Workers Identity Card

Further information on these security initiatives and the various implementation strategies can be obtained from the website of the Department of Homeland Security at http://www.dhs.gov.

These security initiatives and the various precautionary layers involved in maritime security add emphasis to further development and implementation of radio-frequency identification (RFID) devices, smart-chips, and "smart-containers." As nations across the world take measures to harmonize their security standards, they are required to establish secure and protected areas for storing containers. The Electronic Container Seal (ECS) system, which utilizes electronics and radio frequency identification technologies for communications between the electronic container seal and the ECS-user to track the time and date of container door openings and closings, is an important example for advanced RFID technology. The system thus provides security officials with information on whether a container has been tampered with during transport. There are a number of companies in Germany that are active in the development of security technologies (i.e. RFID, smart-chips, mechanical bolts) to support the various operations in the logistic chain.

This market report focuses on the port security industry and the market potential of the electronic seal sub-sector in Germany.

Summary

Port security standards in general are determined by regulations of the International Maritime Organization (IMO) as laid down in the International Ship and Port Security Code (ISPS), in effect since July 2004. Whereas the port security industry in Germany is well advanced, the German market for electronic seals is in its early stages. At present, there are no set global standards for electronic seals to address the question of inter-operability of technical protocols, sensor interfaces, and radio frequencies. Due to this lack of agreement on standards for electronic container seal systems, the growth of the electronic seals market in Germany and worldwide remains stagnant. Nevertheless, prospects for electronic seals in Germany are positive. In an effort to harmonize security programs with the U.S.-led security initiatives, German ports, shipping companies, and container management firms are seeking to strengthen their security measures. According to industry sources, it is anticipated that by mid-2006, every sea container leaving German ports will be required to have an electronic seal.

Currently, there are more than 10 companies active in Germany developing various types of technologies that support the functions of electronic seals; however, the companies do not exclusively concentrate on sea container security. They are engaged in developing smart labels, mechanical locks, cameras, and other electronic devices for various modes of transport and functions across the logistic chain. Since the United States is a world leader in technology and know-how for electronic seals and supporting technology, American businesses have a strategic advantage in exporting their products, know-how, and services to Germany.

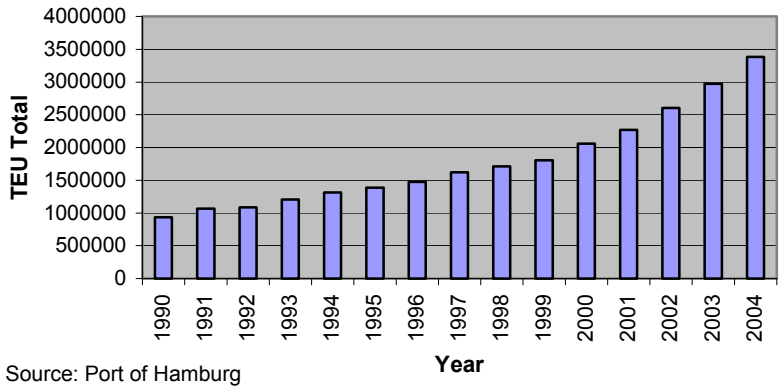
Market Overview

Container shipping is a critical component of global trade: about 90% of global trade is transported in cargo containers. Globalization and market deregulation have also led to advances in security devices and instruments and their strategic integration within the logistics sector. Recognizing the need to integrate security and logistics, nations across the world are taking steps to harmonize their security practices with those of the United States by strengthening control over their commodity flow to and from the United States. While this effort has posed many challenges, it has also stimulated business opportunities in the port-related industries. Consequently, demand for security products and technologies is growing in Germany, which, with its two large ports of Hamburg and

Bremerhaven, is a major global player in sea container transport. These seaports are of great importance to Germany's foreign trade, handling approximately 25% of the country's total exports.

Moreover, Germany's involvement in the U.S. Customs foreign ports program has given momentum to its harmonization efforts. As a result of the government's agreement to participate in the U.S. Container Security Initiative (CSI), the ports of Hamburg and Bremerhaven have begun using detection technology to pre-screen U.S.-bound cargo containers that pose a terrorist risk. The CSI also includes the commitment to developing and using smart and secure containers.

Table 1: Outward Container Shipments from Port of Hamburg



Source: Port of Hamburg

The two German ports of Hamburg and Bremerhaven are among the top 20 "mega-ports" of the world and among the top 10 in terms of export volume to the United States. The port of Hamburg handles close to 31 million tons of goods and the port of Bremerhaven handles nearly 30 million tons of goods per year. In 2001, approximately 257,000 sea cargo containers entered the U.S. from Bremerhaven and 103,000 from Hamburg. In 2004, a total of 89.7 million tons of container cargo left German ports for destinations across the globe.

Table 2: Seaborne Container Traffic at Bremen/Bremerhaven to the United States in TEU

Source: Port of Bremerhaven

Country	2000	2001	2002	2003
USA	706,254	755,319	801,695	813,166

In 2004, a total of 3,384,080 twenty-foot equivalent units (TEU) left the port of Hamburg (see figure 1). It is estimated that by 2015, the world container turnover for the port of Hamburg will rise to 18.1 million TEU. In 2003, a total of 1,671,490 TEUs were shipped from the port of Bremerhaven; 813,166 of which departed for the United States (see Table 2). Experts anticipate that every container leaving German ports will have an electronic seal by mid-2006. This anticipated increase in demand for electronic seals will offer U.S. companies producing supporting technologies for electronic seals ample export opportunities to Germany.

Market Trends

As mentioned before, Germany participates in the U.S.- led Container Security Initiative. Teams of U.S. customs inspectors have been active in the ports of Hamburg and Bremerhaven since 2002. In joint cooperation with the German customs officers, their task has been primarily in targeting and inspecting sea containers bound for U.S. ports and using technology to pre-screen high-risk containers.

Up to now, the approach to freight transportation security has consisted of bilateral agreements between the United States and individual third country parties. However, the European Union is now seeking to incorporate these bilateral agreements into a European-wide regulation. The security measures cover intra-community as well as third

country trade outside of the Union, encompassing all transport modes, international as well as intermodal.

In protecting container cargo during transit, it is important that measures adopted maintain open borders and facilitate commerce while improving security. Information systems of various types will necessarily be employed across the intermodal transport system. Increasing the level of visibility within the supply chain will be achieved through the employment of intelligence devices coupled with electronic control technology, such as electronic seals, but also bar codes, global positioning systems (GPS), and scanning systems.

Standards for electronic seals are also being debated by institutions, such as the International Organization for Standardization (ISO), with the aim to agree upon a radio frequency that can be used by all nations to ensure inter-operability. Currently, standards exist only for mechanical container seals and passive RFID tags. The following list summarizes the ISO codes on electronic container seals currently being developed:

- ISO/CD 18185-1: Freight Containers: Radio-frequency—Part 1: communication protocol for e-seals
- ISO/CD 18185-2: Freight Containers: E-seals—Part 2: Application Requirements
- ISO/CD 18185-3: Freight Containers: E-seals—Part 3: Environmental characteristics
- ISO/AWI 18185-4: Freight Containers: E-seals—Part 4: Data protection
- ISO/AWI 18185-5: Freight Containers: E-seals—Part 5: Sensor interface
- ISO/AWI 18185-6: Freight Containers: E-seals—Part 6: Message sets for transfer between seal reader and host computer
- ISO/CD 18185-7: Freight Containers: E-seals—Part 7: Physical layer

In addressing the financial aspects associated with the integration of electronics-based technologies in German ports, government agencies such as the Federal Foreign Office are supporting the various initiatives and standards set by the International Maritime Organization (IMO). As a result, ship owners and ports have introduced a wide range of measures to combat terrorism. However, due to the cost of such measures, German ports are beginning to introduce security fees. As of July 1, a security fee of EUR 9 per container will be charged for export containers handled in Bremerhaven and Hamburg. Similar discussions are underway for the ports of Lübeck and Rostock.

Import Market

Container turnover at German ports is very high and will grow even higher in the next 10 years, increasing the demand for electronic seals. As U.S. firms already have a strong foothold in developing and advancing the technologies for electronic seals, the German demand for such technology from U.S. firms will be high.

The future prognosis for the RFID devices market is very positive. Up until July 2004, approximately 360 million RFID-tags were produced in Germany. The global market for RFID-technologies in 2000 was close to USD 900 million, including hardware and software services for commodities management, logistics systems and security applications. RFID-chips accounted for USD 76.3 million of worldwide sales. It is estimated that by 2008, the global sales volume of RFID-chips will grow to about USD 3.1 billion. Worldwide sales-volumes for RFID-tags will grow to around USD 45 billion by 2009. 2004 estimates predicted that in Europe alone, the sales of RFID-tags would grow by USD 1 billion in a five-year period.

Competition

Because the market for electronic seals is still very young, there is little to no competition either globally or within Germany. Currently, competition exits in the R&D field rather than in actual sales, which is due, in part, to the lack of international standards (i.e. ISO) on RFID seals. Corporations such as Infineon Technologies AG, Manhattan Associates GmbH, ACD Elektronik GmbH, and CASIO Europe GmbH are the main players among over 10 companies in Germany that are active in developing the technologies, platforms, software, and peripherals supporting the function of e-seals. However, until global standards are set, the market for electronic cargo seals in Germany will remain in the developing stage.

End-Users

Due to the high cost of e-seal technology, the number of end-users can be expected to be limited to the producers mainly exporting container cargo and major physical container operators, such as Hapag Lloyd and Hamburg-Süd. Port terminal operators and ports are also likely end-users of e-seal technology, especially of supporting devices, such as scanners and attached software solutions. At this point in time, however, potential users are hesitant to invest due to the uncertainty of future developments and the lack of RFID standardization. In addition, it is unclear how detailed the information contained in the seals will be and who will have access to that information, some of which may be considered confidential by the consignor/consignee. As a result, there are very few electronic cargo seals in use today.

Market Access

Whereas there are a relatively small number of traditional container seal (i.e. mechanical bolts) providers worldwide, the electronic aspect of container security has added a large number of potential players to the market both internationally and locally. At the present, the import of seals into Germany is not subject to import tariffs. A 16 percent import-turnover tax is payable at the border. In later distribution stages this import tax is passed on to the ultimate end-user as a Value-added Tax.

In general, the German market for security products and technology is open to American products. To gain access to the German market, U.S. exporters can use the services offered by the local branches of the U.S. Commercial Service in Germany. The U.S. Commercial Service assists exporters in finding buyers, partners, agents or distributors within the Federal Republic of Germany. The Gold Key Matching Service, for example, provides one-on-one appointments with pre-screened potential agents, distributors, sales representatives, association and government contacts, licensing or joint venture partners, and other strategic business partners in the German market. Furthermore, participation in German trade fairs would be an efficient method for U.S. exporters to expose themselves to the German market.

Opportunities for Profile Building

Associations

Nearly all facets of doing business in Germany have a relevant industry or trade association that can often serve as a suitable point of contact when trying to establish a partnership. Related associations include:

Zentralverband der deutschen Seehafenbetriebe e. V. (ZDS)
(Federal Association of German Seaport Operations)
Internet: http://www.zds-seehaefen.de/index.html

Verband Deutscher Reeder
(German Ship-owners Association)
Internet: http://www.reederverband.de

Bundesverband des Deutschen Gross- und Aussenhandels e.V. (BGA)
(Federation of German Wholesale and Foreign Trade)
Internet: www.bga.de

Trade Fairs

Germany hosts leading international trade events in virtually every industry sector, attracting buyers from around the world. U.S. exhibitors at German fairs should be prepared to take full advantage of the business opportunities presented at these events. While U.S. exhibitors and visitors can conclude transactions, all attendees can use major German trade fairs to conduct market research, see what their worldwide competition is doing, and test pricing strategies. Relevant trade fares include:

Shipbuilding, Machinery, and Marine Technology (SMM) (September 26-29, 2006)
Internet: http://www.hamburg-messe.de/smm/smm_en/start_main.php

Transport Logistics 2005 (May 22-25, 2007)
Internet: www.transportlogistic.de

Advertising

In promoting their products in Germany, exporters must also yield to local advertising and promotion regulations. Regulation of advertising in Germany is a mix between basic rules and voluntary guidelines developed by the major industry associations. As established in the early 20th century, the "Law Against Unfair Competition" allows for suits to be brought upon responsible parties if their advertising campaigns "violate good manners" or best-practices. Many advertising practices that are common in the United States, such as offering premiums, are not allowed in Germany. Any planned advertising campaigns should be discussed with a potential business partner or an advertising agency in Germany.

Gesamtverband Kommunikationsagenturen e.V.
(German Association of Advertising Agencies)
Internet: www.gwa.de

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You can locate your nearest U.S. Export Assistance Center, as well as Commercial Service offices overseas by visiting www.buyusa.gov

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